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LECTURES.

CLINICAL LECTURES ON THE PHYSIOLOGICAL PATHOLOGY OF SYPHILIS.¹

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GENTLEMEN, — In entering to-day upon the systematic clinical study of syphilis, it will be worth our while to review briefly the teachings in regard to its history and nature, as presented to you somewhat in detail on a previous occasion. By citations from our most valued authorities it was made plain that the disease was of very ancient origin, antedating the Christian era by many centuries. It was made equally evident that while syphilis had been the subject of much and careful study during a long period, great differences of opinion existed in regard to its nature and the manner in which it affected the human organism. By the earliest writers accepted as a punishment inflicted upon the human race through some offended mythological deity, it was treated by prayers and sacrifices. But as the medical profession grew more observant and less superstitious, it came to be considered the result of a venereal miasm, which might be modified, possibly cured, by medical measures. The miasmatic doctrine in its turn gave way to farther observation and closer study of the matter, until we found, at about the middle of the sixteenth century, that contact with a person suffering from syphilis was held to be essential for the acquirement of this disease. From this fact it was assumed that a mysterious contagious element resided in the secretions of the syphilitic lesions, and thus the doctrine of a *virus* was first established. These lesions were, however, often so complicated with certain simple venereal diseases that a very long period elapsed before the separation was effected. Even now it can scarcely be said that syphilis has been absolutely separated from the local disease called the chancre. This matter, as you know, has been much discussed, for the last quarter of a century, under

¹ Reported by P. Brynberg Porter, M. D.

the title of the unity or duality of syphilis. A vast amount of clinical evidence has been adduced in favor of each: one party claiming that syphilis is the only parent of chancroid, — the local venereal ulcer, — and that, while the latter is *usually* a local disease, it may under certain circumstances acquire the power of communicating syphilis: the opposing party denying that power under all circumstances, and asserting the individual and unchangeable nature of each. Notwithstanding the profusion of clinical evidence always available in these discussions, this important question still figures as the "tug of war" in all general syphilitic discussions. It may be well at this point to call your attention to the fact that clinical observations, which have been thus far almost solely relied upon for the solution of the disputed questions in regard to venereal diseases, are, as a rule, made under such peculiar embarrassments — moral, mental, physical, and circumstantial — that the same apparent conditions falling under the notice of one observer often present phases and peculiarities in the experience of another that warrant entirely different conclusions. Hence it is that notwithstanding syphilitic disease has been studied by numerous earnest, honest, and competent observers, wide and sincere differences of opinion still exist in matters of great practical importance, aside from unity and duality. Thus, as has been seen, in regard to immediate and gradual infection in syphilis, the profession are still about equally divided: one side claiming that the virus of syphilis infects the entire system at the moment of inoculation, while the other claims that the initial lesion is purely local for a time, and that the organism is gradually affected.

Also in regard to the question of hereditary influence: one party claiming that syphilis may be communicated to the embryo through the spermatozoön furnished by a syphilitic father; the other holding, by virtue of an equal amount of clinical evidence, that this is never the case, but that the male parent can only infect his offspring through the medium of the maternal influence, that is to say, by first infecting the mother.

Nor is it alone in regard to such points of doctrine as have been cited that unsettled questions confront the student of syphilitic disease. Deductions from clinical observations continue to give us the most varied and discordant views and opinions, even in regard to the nature of the disease and its mode of affecting the system. Thus among those figuring in the history of syphilis, previously narrated, we may recall the views of the more modern authorities. Erasmus Wilson,¹ in 1832, gave it as his opinion that when the poison of syphilis is once admitted into the system, it has a tendency to accumulate until the entire system is saturated with it. As soon as this point is

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reached, he says, "an outburst of fever occurs, which results in the elimination of the excess of the collected poison." Acton,¹ in 1860, in regard to syphilitic infection, rejects this and all other attempts at explanation. He says, in so many words: "Clinical observation teaches only the facts, the *modus operandi* remains undiscovered; the real explanation of the matter we do not know."

Virchow,² Vidal, Billroth, and Sigmund each give us different opinions based upon clinical observation, no one of which sheds any new light upon the practical features of the disease. Lancereaux, in 1869, expressed the opinion that "syphilis affects the system like alcohol, contained in the blood and acting upon the net-work of organs, in which it occasions at the same time with hyperæmia the development of the elements of new formation." As regards the manner of absorption of the virus, he says "it is a matter that ill bears discussion." Mr. Hutchinson, of London, in 1871, gave it as his opinion — the result of a large clinical experience — that syphilis was a "specific fever, like small-pox, measles, and scarlet fever. . . . Like them," says Mr. Hutchinson, "it has its stage of incubation, efflorescence, relapse, and decline, . . . but that the stages are more protracted; instead of counting its duration by days we have to count by weeks or months."

We shall find it difficult to believe, however, that Mr. Hutchinson now attaches much importance to this alleged similarity between the specific eruptive fevers and syphilis when we recall, in the great discussion before the Hunterian Society of London in 1874, the announcement of his conviction that "*mercury* is the true vital and physiological antidote of the syphilitic virus."

It is true at this time that, through clinical observations, syphilis has come now to be appreciated in its varied manifestations, — that each of its lesions has been accurately studied and described; but clinical research has never solved the problem of its nature, or mode of development, or explained the connection between the different lesions and stages of syphilis. It has elucidated no mystery, nor led to any philosophical mode of treatment. Thus to-day, while recognized in its physical appearances, in its pathological results, while successfully combated in its protean developments, its position in medical literature is without scientific basis. It is yet unconnected with any ascertained physiological or pathological laws; explanations of its nature are but unsupported and contradictory opinions; methods of treatment purely experimental or empirical.

Hitherto we have studied but the external evidences of the disease, each manifestation presenting as a distinct and unexplained problem,

¹ Acton. London Edition, 1860, pages 279 and 342.

² Otis. Physiology of Syphilitic Infection, pages 8 and 9. New York Journal of Syphilography and Dermatology, July, 1871.

and have treated it by medicines and by measures which experience and experiment have shown to be "good for syphilis." The advances in physiological science, the immense strides in knowledge of histology and pathology by means of the microscope during the last twenty years, have given insight into the causes of disease which clinical observation alone could never have effected. The discovery by Beale of the active principle of the cattle plague, small-pox, the vaccine, etc., — *the living animal disease germ*, — led to the inference that a similar living principle constituted the virus of syphilis, and this Beale claimed in 1866. Verson and Beisiadecki, in 1869, were the first, by careful microscopical examinations, to recognize a peculiar and excessive accumulation of lymph or white blood cells as the first effect of the syphilitic process, and as a cause of the induration of the initial lesion. This matter seems to me so important in establishing a starting-point for the physiological explanation of syphilis, in its various phases, that I shall quote entire the results of Beisiadecki's observations on this point, as published in the Archives of the Academy of Sciences of Vienna in 1867. He says: "I have studied the Hunterian chancre in twenty specimens. The *induration* consists in a cell infiltration of the papillæ of the corium and subcutaneous connective tissue. The infiltrated cells are similar to those of dermatitis. They are round, have one or two nuclei, have a finely granular protoplasm, and separate the connective tissue equally. These fibres retain the normal size, are not infiltrated as in dermatitis; they are apparently denser and more resistant to chemical reagents. But the arrangement of the cells differs from that in dermatitis. In those places where a rich cell proliferation has taken place, and in their vicinity still more, we find that the neighboring tissue of the vessels, as well as of their walls, are abundantly infiltrated with cells. The walls of the capillary vessels of the papillæ are thickened, have a shining and rigid appearance, and *inclose numerous nuclei which project even into the lumen of the vessels*. The adventitia of the arteries and veins is three times its normal thickness, *in consequence of the presence of numerous round, spindle-shaped, and branched cells*. The calibre of the vessels is diminished, but the vessels are permeable. If the induration still increases we find in its vicinity *an abundant proliferation in the adventitia of the vessels, and subsequently the adjoining connective tissue cells enlarge and proliferate*, and anastomose with those situated in the adventitia by means of their processes.¹ . . . The induration is explained". (however, he further remarks) "neither by the number of cells nor by their peculiar properties, but by the fact that while in *dermatitis* we have a proliferation of cells, and also a serous exudation which infiltrates the tissue cells and fibres, in the *induration* of syphilis we have a dry, anæmic tissue, resistant connect-

¹ Italics my own.

ive tissue fibres, considerably thickened walls of vessels. The dryness of the induration, which produces the hardness and also the anæmia, is caused by the *proliferation in the walls of the vessels*, which makes it difficult for the serum to leave the vessels, and also diminishes their calibre. And this," he says, "explains why the syphilitic induration breaks down into a molecular mass, and why resorption takes place so slowly. *This investigation*," says Beisiadecki, "*might give us a clue to the mode in which the organism is infected.*"

"In consequence of experiments on animals and man, we came to the conclusion that the blood capillaries are surrounded by perivascular spaces, and that the adventitia of the blood-vessels is in part to be regarded as belonging to the lymphatic system. We have seen that the cells of the adventitia are in a condition of proliferation; that this proliferation is in the walls of vessels distant from the induration. We also know that when the induration continues, the larger lymphatic vessels appear as thick cords on the dorsum penis, and that the corresponding glands take part in the process. These cells, formed in the lymphatic system, can easily enter the lymph current and the blood, and become the carrier of the contagium." From this he concludes that "*the infection of the organism is not caused by absorption of fluid or broken-down substances in an unknown way*, but the progressing inflammation of the lymphatics and glands, the formation of cells in them, and the entrance of these cells into the lymph current as *living elements* may be regarded as the cause of the general infection."

Here, then, we have claimed, as a result of scientific investigation, the localized and abnormal proliferation and accumulation of germinal cells at the point of a syphilitic inoculation. If we are willing to accept the conclusions of Beale, that the germ of syphilis is a degraded human germinal cell, capable of uniting with the normal human germinal elements and modifying their nature and behavior, we shall find a reasonable cause for this excessive localized cell accumulation. Beale says that this disease germ is a living amœboid cell, possessing, like the white corpuscle of the blood, the vital movement, and a like power of multiplication; "it is a molecule of living matter, derived by direct descent from the living matter of man's organism, — living matter which retains its life after the death of the organism in which it was produced; living matter which has descended from the living matter of health, but which has acquired the property of retaining its life under new conditions; living matter destroyed with difficulty, and possessing such wonderful energy that it will grow and multiply when removed from its seat of development and transferred to another situation, provided only that it be furnished with suitable nutritive pabulum." ¹

¹ Disease Germs, their Nature and Origin, Lionel Beale, M. B., F. R. S., London, 1872, page 143, etc.

When it comes to be remembered that, through its degradation, the disease germ may be reduced in size even to $\frac{1}{100,000}$ of an inch or less in diameter, while its powers of movement and proliferation are still retained, and that the normal white blood corpuscle is only $\frac{1}{300}$ of an inch in diameter, it will be readily seen that this disease germ might easily, through contact, become incorporated with the white corpuscle, and proliferate in its substance; again, with increased rapidity, proliferating *with it*, be carried *by it* through the natural physiological channels; thus finding its way to the most distant points of the human economy, to develop or deteriorate in accordance with the effect produced by the introduction of this degraded element into its substance.

Thus far, through microscopical examinations, we have seen the apparent effect of the syphilitic element in producing an excessive proliferation of cells at the point of inoculation. Verson, Beisiadecki, and Auspitz have recognized a local result of this in an obstruction of the vessels of nutrition of the part, and this producing an anæmic condition which finally results in a molecular necrosis of the indurated tissue.

Now this we observe as a clinical fact. Here, for instance, is a young man, Case I., who had a suspicious venereal connection about five weeks ago. He represents himself as having been in perfect health at the time. On the morning after the connection he noticed a slight abrasion just behind the fossæ glandis. This, however, healed without treatment during the next twenty-four hours. A week since, on the site of that abrasion, he found a little bunch about the size of a pea, but without tenderness. His general health was still perfect.

We have here, apparently, a classical initial lesion of syphilis, as determined by clinical observation. I would be glad to have you come forward and examine the physical characteristics of this lesion. You observe that, pressed between your thumb and finger, the papule is hard, almost like a nodule of cartilage; also that it is movable under the skin. Its color is deeper than the surrounding tissue. There is no tenderness, but as you make tense the tissue over it, thus, you observe that the papule shows a pale yellow color. Now let us examine the evidences which point to syphilis in this case. First, it has followed a suspicious venereal connection. The patient claims that this was his first and only connection, and this was five weeks since; second, that the abrasion consequent upon it immediately healed. We know as a clinical fact that the wound of an artificial inoculation of pure syphilitic material, such as may be found in the blood in active syphilis or the secretion of a mucous patch in the mouth, heals promptly, as if no such inoculation had taken place; third, that nearly four weeks after the healing of the abrasion, a hard nodule was found

on its site. This period or interval of apparent rest, between the inoculation and recognition of an induration at that point, is a well-ascertained clinical fact in the history of syphilis, and is known as the *period of incubation*. There is nothing to account for this nodule except an abnormal cell accumulation, and no apparent cause, inflammatory or otherwise, for this accumulation, except the local *proliferation* of cells. If not caused by the syphilitic influence, as claimed by Beale and confirmed by Verson, Auspitz, and Beisiadecki, we have no explanation of it. These cells, according to the same authorities, are formed in the lymph spaces, the connection of which with the lymph vessels would, if accepting their views, lead us to look for further evidences of the disease in the line of the lymphatic system rather than in the blood vascular system.¹

The nutritive fluids exuded by the blood-vessels into the tissues are said to be in constant movement, and that too in a direction towards the lymphatic vessels, through which the excess over and above the necessities of growth and repair is carried back into the general blood current through the subclavian veins. This tissue-fluid, or lymph current, then, would serve to carry the germ of syphilitic disease from the surface of inoculation towards and into a lymphatic, the nearest lymphatic vessel. Movement through the lymph spaces is said to be retarded by a coagulation of the tissue fluid from slight irritations, while this retardation is most favorable to cell proliferation. Here, then, we find sufficient reason for detention of the infective process at the point of inoculation for a period greater or less. In the many instances of short incubation, or interval between the date of inoculation and the occurrence of characteristic gland enlargement, which I have seen, in the very great majority of cases the initial lesion has been near the frænum preputialis; a point where, according to modern histologists,² lymphatic vessels come nearest to the surface. In a case quoted in my article on the Physiology of Syphilitic Infection, published in the *Journal of Syphilography* in July, 1871, it was shown that the syphilitic inoculation was through a punctured wound of the finger, and that axillary enlargement followed within twenty-four hours, and general constitutional infection within six weeks, from that time.

We have, then, a so-called period of incubation of about three weeks, in the presenting case. This is claimed as the result of extended clinical observation to be about the average, although cases are recorded of intervals as brief as twenty-four hours, and as long as seventy days. Once a characteristic induration is observed, however, it is rare not to find lymphatic glands in nearest connection with it also

¹ Sudoriparous and Lymphatic Systems, by Robert Willis, London, 1867. The Lymphatic System, by Professor Recklinghausen. Strecker's Human and Comparative Histology, Sydenham Ed., vol. i., page 267.

² Ballieff, etc.

indurated and enlarged. Examination in this case shows this enlargement to have occurred. Here we find them in both inguinal regions, as large as a buckshot, hard, movable, and insensitive; as I press upon them the patient makes no sign or expression of pain. Recent painless gland enlargement is strong clinical evidence of the presence of syphilis; taken, as here, in connection with an indurated nodule, appearing three to four weeks after a suspicious venereal connection, renders it exceedingly probable that the trouble is syphilitic. This view is also confirmed by the possibility of accounting for this physical manifestation through the view of abnormal cell proliferation set up by a syphilitic disease germ.

CASE II. This case, which you may designate as W. G., presents another form of local lesion, also on the reflection of the mucous membrane of the prepuce, where, by the way, venereal accidents are most common. His history is as follows: First, an impure connection, or rather several, occurring during a period of three or four weeks. Naturally dating from the last, he states that three or four days after he noticed an abrasion which he supposed to be a simple chafe. In this opinion a medical gentleman whom he consulted coincided, and gave him an astringent lotion to apply. The trouble, however, slowly increased. The lesion was cauterized without benefit, and has since been treated with various lotions. Here you see a raw surface, about the size of a three-cent piece, lying, as the touch at once reveals, on an indurated base. There is no apparent loss of tissue; on the contrary, the part is elevated above the healthy surrounding structure. There is no evidence of suppurative action. The scanty secretion which moistens the surface of this lesion is serous rather than purulent, showing, under the microscope, chiefly epithelial scales, instead of pus corpuscles. This is evidently an initial lesion of syphilis, differing from the former case in that the cell infiltration has here involved the more superficial layers of its covering, no longer movable over the induration, but broken down from what Beisiadecki has called *anæmia* of the tissue, but which Virchow has called a *necrobiosis*.

Here, also, we find enlarged and indurated inguinal glands on either side, and also a distinctly knotted cord, movable under the finger, about the size of a goose quill, running back from the induration, just underneath the integument of the dorsum penis, until it is lost in the tissues near the right crus penis. This is an enlarged and indurated lymphatic vessel, evidently connecting the initial induration with the nearest lymphatic gland. It is not unfrequently found if carefully looked for, and would seem to clear up any possible doubt as to the mode of connection between the trouble at the point of inoculation and the inguinal gland enlargements, and shows that these gland enlargements are not caused by any reaction from a general

constitutional infection, but are evidences of cell accumulation from appreciable causes, and through recognizable physiological channels. At our next session I hope to be able to present other forms of the initial lesion of syphilis, and to show, as in the two cases brought before you to-day, that variations in form are chiefly due to differences in the locality and extent of cell accumulation; to show also that syphilis is, *per se*, neither inflammatory nor destructive, but consists primarily in a process of cell growth and accumulation, and thus quite opposed in its nature and action to the venereal lesion called the chancre.

TRAUMATIC ANEURISM THE RESULT OF A RUPTURE OF ONE OF THE RIGHT LUMBAR ARTERIES.

BY A. C. HEFFINGER, M. D., UNITED STATES NAVY.

H. D., seaman, United States navy, native of Boston, Mass., aged thirty-eight. Previous naval service twelve years, during which he enjoyed uniformly good health. Family history good. On June 17, 1878, he received a blow upon the right side, between the ribs and the crest of the ilium, from the handle of a hose cart, while running with it through the navy yard. He was at once thrown into a state of shock, in which he remained six hours. Reaction was cautiously brought about by stimulants; as soon, however, as it set in he had a hæmorrhage from the rectum, passing two hundred and fifty C. C. of uncoagulated blood. Peritonitis ensued on the following day, and was combated by hot fomentations and morphia. He was admitted to the Naval Hospital, Chelsea, Mass., June 27th, ten days after the accident. At that time the peritonitis had greatly subsided. An extensive ecchymosis was found over the right ilium. The bowels were constipated. His urine contained red blood and pus corpuscles in considerable amount, and some albuminous casts; specific gravity 1010. Hot fomentations and morphia were continued, and he was put upon a light, nutritious diet.

On the 28th he was seized with an attack of cramps in the lower part of his abdomen extending into both groins. This lasted about half an hour, when he suddenly became better, and in a few minutes passed 3.15 C. C. of bloody urine containing a clot three centimetres long and one centimetre thick. Three hours after this obstinate vomiting set in, and was relieved with much difficulty by creosote and brandy.

On the 29th he was seized with cramps in the same manner as on the previous day, and in ten minutes after the onset he passed by urethra two hundred and fifty C. C. of pure blood. Morphia and ergot were given hypodermically, and no more hæmorrhage ensued. From this time until July 2d the patient gradually improved, but on the

evening of the 2d he was again seized with abdominal cramps, and urinated with difficulty, small clots of blood passing out with the urine. A catheter was passed, and sixty C. C. of bloody urine were drawn off. After this the patient did well, blood gradually disappearing from the urine.

On the 6th the right lower extremity became œdematous, and only six hundred and twenty-five C. C. of urine were passed. The urine, however, gradually increased in amount, and became normal in character on the 16th.

On the 20th an examination of the right side showed that an area of dullness extended from the margin of the ribs to the crest of the ilium, and at the umbilicus five centimetres to the left of the median line. A slight protuberance was noticed to the right of the umbilicus. A tumor appeared to be occupying the entire right half of the abdominal cavity, and distending its walls. The right lower extremity still remained œdematous. It was the general opinion of the medical officers of the hospital that the patient had either a displaced liver, or an hepatic abscess. The persistent normal liver dullness above seemed to preclude the idea of much displacement. His treatment at this time was simply supporting. August 4th both lower extremities and the scrotum became œdematous. The extremities were bandaged and elevated. On August 8th his left knee was greatly swollen and painful. Much tenderness existed in the course of the left internal saphenous vein. Pulse 102; temperature 101° F.; respirations 21. There was much cough, and mucous râles were heard over both fronts. The urine was scanty, and the perspiration profuse. Pyæmia was suspected, and thirty grains of quinine were given every four hours.

The patient improved immediately, and in a few days the fever had entirely disappeared. The quinine, however, was continued in diminished doses for some time afterward. The patient's general health gradually improved, but the abdominal tumor continued to enlarge, and an abdominal supporter was applied on the 18th. Notwithstanding the supporter the pressure of the tumor on the lumbar plexus caused him much pain, and its interference with the digestive apparatus reduced him greatly. On September 3d he was very weak. Considerable percussion dullness was found over the antero-inferior portion of left lung. The right lower extremity, scrotum, and penis were very œdematous. The patient lay constantly on the right side; much pain was caused and a sense of suffocation when he lay on the left. His strength was maintained by stimulants and nutritious diet. After this he had repeated spasmodic attacks of pain in the right inguinal region extending into the corresponding thigh, which were relieved by morphia hypodermically. He continued to lose strength, and nutritious enemata were given him. There was little change in the patient's condition until Sep-

tember 27th, when œdema of the lungs and pericarditis set in. Under this combined attack the patient's condition was deplorable to the last degree. Much to the surprise of the medical staff, under anodynes and stimulants he began to improve. The œdema of the lungs became less distressing; pericardial effusion followed, and in a short time disappeared. The patient remained in this critical condition until October 13th, when the right upper extremity became œdematous, and the lungs comparatively free. Paroxysms of pain in the lumbar plexus occurred daily from this time on, and .18 gramme, and sometimes .210 gramme, of morphia was given at a dose, hypodermically, for their relief. Œdema of the lungs came on again October 27th, and the condition was most pitiable. Serous transudation into the bronchial tubes was so profuse that suffocation appeared imminent. The expectoration was frothy, and contained much blood; brandy was given by mouth and rectum. In a few hours he breathed more easily, and after a good night's rest, induced by morphia, was much improved. Bed-sores at this time began to trouble him. Several places over the sacrum were slightly excoriated, and a small ulcer existed over the right trochanter major. These were treated with glycerine and air-cushions, and made no farther progress. On November 5th he passed five C. C. of foetid pus per rectum, and he continued to pass about the same amount in every stool for several days. Œdema of the lungs became very much worse on the 11th, and was attended with severe pain in the lower part of the abdomen, occurring from two to three times in every twenty-four hours. He remained in this condition, too weak to change his position, and scarcely able to speak, till the morning of the 13th, when he became unconscious at six A. M., and remained so until he died, at nine A. M.

Sectio cadaveris, six hours after death. External appearance: the body was greatly emaciated; there was much œdema of the lower extremities, penis, and scrotum; marked suggillation of back of head and neck, and entire posterior region of trunk. The abdomen presented an extensive enlargement, reaching from the eighth right costal cartilage and rib to corresponding crest of ilium, and across at the umbilicus, five centimetres to left of median line. *Thoracic viscera*. The left pleural cavity contained nearly a litre and a half of clear albuminous fluid; no evidence of recent pleuritis. The right pleura was adherent throughout. The left lung was very œdematous, carnified in antero-inferior part, contained a small area of cicatricial consolidation in apex, and weighed a kilogramme. The right lung was not so œdematous as left; carnified in antero-inferior part, the upper half presenting a mass of cicatricial consolidation; it weighed six hectogrammes. The bronchial lymphatic glands were much enlarged. *Heart and great vessels*. The pericardium was closely adherent over its entire area. The heart was greatly enlarged, weighing six hectogrammes. The right auricle

was enlarged, but its walls remained of normal thickness. The right ventricle was enlarged; walls slightly thinned, having an average thickness of seven millimetres; both auricle and ventricle were filled with dark, clotted blood. Left auricle slightly hypertrophied. Left ventricle considerably enlarged and hypertrophied; average thickness twenty-two millimetres. The right semilunar valve of aorta was calcified at several points along its attached border. A slight softening, seven millimetres in length by four in width, was found on inner surface of aorta, just above the right semilunar valve. The other vessels were healthy.

Abdominal viscera. On opening the abdomen a large tumor presented itself, filling the entire right half of the abdominal cavity, — excepting a small portion at top, occupied by the liver, — and extending from two to two and one half centimetres over the vertebral column, from the first lumbar vertebra to promontory of sacrum. The intestinal canal was entirely upon the left side, except the ascending, descending, and three centimetres of the transverse colon, which was lying upon the tumor, and was much reduced in size from the pressure which had been exerted upon it by the tumor behind, and the liver and anterior abdominal wall in front. The head of the pancreas, though still attached to the duodenum, was almost entirely obliterated. The mesenteric glands were greatly enlarged. A chronic peritonitis had existed around the tumor, and about a litre of albuminous fluid was found in the peritoneal cavity. The tumor was firmly attached to the under surface of the liver, right side of abdominal wall, whole extent of right lumbar and part of corresponding pelvic and iliac fasciæ, and to the bodies and intervertebral discs of the four lower lumbar vertebrae. The liver was removed, and found diminished in size, pale, and weighed one and one half kilogrammes. Many of the hepatic veins were nearly obliterated, and the vena cava inferior was completely obstructed just below the liver by pressure from the tumor. Portal circulation intact. The stomach was discovered pushed to the extreme left hypochondriac region, the greater part being behind the spleen. The spleen was slightly enlarged, otherwise healthy. The stomach was much reduced in size, and its walls very thin in places, principally along the greater curvature. It contained sixty C. C. of bile and mucus. The small intestine was empty; the large intestine was much smaller than usual, and almost empty; an opening connecting it with the tumor was diligently sought for without success. The tumor was dissected from its attachments, and removed without rupture. It weighed eight kilogrammes. On being opened it was found to contain a mass of laminated fibrin; the upper layers were old and firm, the lower becoming less and less so, till at the base of the sac fresh clots were found. The sac weighed twenty-one hectogrammes. Average thickness of walls fifteen millimetres, except at base, where the thickness reached four centime-

tres. The aorta was partially included in left side of sac for five or six centimetres. Inferior vena cava was obliterated for ten centimetres. Dr. R. H. Fitz examined the sac, and found a horse-shoe kidney in the posterior portion; of its wall, thirty-three centimetres long and seven wide at the large extremity. It had two pelves, one of which communicated with the cavity of the sac by several sieve-like orifices. There were two ureters included in the posterior wall, and much dilated. He found the vascular supply very irregular, but succeeded in tracing one of the right lumbar arteries, which was closed by a thrombus, into the sac. The obliterated inferior vena cava, though partially included in the posterior wall of the sac, did not communicate with it. As the lumbar artery was the only demonstrated communication with the sac, the aneurism probably resulted from a rupture of its walls. The channels of collateral circulation were carefully looked for; none, however, could be found before removal of the tumor, and the destruction of relations necessary in doing this rendered it impossible to trace them in the abdominal cavity afterward. The superficial veins were not enlarged.

RECENT PROGRESS IN FORENSIC MEDICINE.

BY F. W. DRAPER, M. D.

Cadaveric Phenomena. — Professor Hofmann, of Vienna, has recently published the results of his observations upon the phenomena presented by the dead body in their medico-legal relation.¹ Among the topics discussed are the following: —

He found that blood taken from a dead body with the precaution to prevent any access of air does not give in the spectrum two absorption bands of oxyhæmoglobin, but a single broad band only, corresponding to reduced hæmoglobin simply. This discovery was originally made by Professor Gwosdew, of Moscow, in examining the blood of persons dead by asphyxia, and he regarded it as diagnostic of that form of death. It has been shown, however, by other observers that the blood of every dead body presents the same spectroscopic characters provided it has not been exposed to the air. It would appear, therefore, that the tissues of the body take the oxygen from the blood in a few minutes after the lungs have ceased to act. The venous blood, then, contains only the reduced hæmoglobin. Hoppe-Seyler and Hofmann have confirmed this. But it has been shown that there are some exceptions to this condition in certain forms of death, such as carbonic oxide poisoning, death by cold or starvation, and death by the entrance of air into the veins; in these exceptional cases the blood retains its oxidized characters. But

¹ Vierteljahrsschrift für Gerichtl. Med., xxv. and xxvi.; London Medical Record, November 15, 1878.

even under such extraordinary conditions the contrast in the character of the blood is probably only temporary; Hofmann observes that the blood has the power of consuming its own oxygen when there is no contact with organic tissues.

Hofmann also directs attention to the difficulty, amounting sometimes to an impossibility, of distinguishing cadaveric lividity from ecchymosis in the presence of putrefaction. As putrefaction advances, the cutaneous and subcutaneous tissues imbibe the liquefied blood and become reddened thereby, thus resembling ecchymosis; the more advanced the decomposition, the greater the similarity becomes. In contused parts the extravasated blood is liquefied and diffused like that of the sound tissues, thus increasing the difficulty of distinguishing sound from injured parts. In some cases extravasation from rupture of the vessels of the skin may result from simple hypostasis. If a dead body remain suspended a long time petechiæ may be found in the skin of the dependent parts, their situation being the chief guide by which they are distinguished from those produced in life.

Hofmann's article is concluded with some observations on putrefaction in its relation to the identification of the dead body. The difficulty of establishing identity because of the deformity produced by gaseous decomposition is especially illustrated in cases of drowning. Hofmann has practiced with success the following method for restoring the features so as to permit the recognition of the individual. His method is based on the fact that the green coloring matter of putrefaction is soluble in water. The head is opened in the usual way, the brain is removed, and deep incisions are made into the parietal and occipital regions; the head is then placed in cold, running spring water. In from twelve to twenty hours the green color has almost if not entirely disappeared, and the swollen appearance has been much reduced. The calvaria is then replaced and held by the scalp, which is drawn over it. The head is then plunged into a saturated solution of corrosive sublimate in alcohol, and by this any remaining color or emphysema is removed; the face resumes its natural form, the skin being of a grayish-white color from the action of the chloride.

A microscopic examination of the various tissues shows that putrefaction begins generally by a chemical change of the albuminous compounds, simulating in appearance the fatty degeneration of a living tissue. Hofmann remarks that this is an important fact to bear in mind in connection with degenerative changes of glandular organs like the kidneys and the liver as a result of pathological processes, the appearances being analogous. Hofmann remarks incidentally, in the course of his paper, that he has observed the movements of the spermatozoa in from eighty to one hundred hours after the man's death.

Sub-Pleural Ecchymoses in New-Born Children. — Pinard has re-

viewed this subject recently, and his observations may be summarized as follows: ¹—

(1.) Punctated sub-pleural and sub-pericardial ecchymoses may be found in infants who have died during labor, or even several moments after birth, from arrest of the circulation, as well as in those who have died from suffocation.

(2.) Ecchymotic stains may be found on the lungs, pericardium, and thymus gland of children who have died several hours or days after birth in consequence of the conditions to which they were subjected during their birth.

Death by Submersion. — MM. Bergeron and Montano have reached the following conclusions as the result of their experimental and anatomical observations on the subject of death by drowning: ²—

(1.) The presence of a frothy foam, not only in the pharynx and the larynx, but also in the bronchi, is the constant sign of death by submersion, whether syncope or asphyxia predominated in the mode of dying, and whether the individual was free in his movements, or was thrown into the water after having been made insensible by opium or chloroform, or was partly suffocated, or was fettered in his action. This absolute constancy of the presence of foam, whatever the special condition in which submersion occurred, is, in the opinion of the authors, the single sure uniform sign proving death by drowning.

(2.) There is always a certain degree of congestion, and sometimes sub-pleural ecchymoses are seen; but these ecchymoses, which give the lungs a spotted or speckled look, are unlike the punctate ecchymoses of suffocation. The sign given by Tardieu as characteristic of this latter form of death accordingly preserves its significance.

(3.) The intensity of the hyperæmia and the extent of the ecchymoses are always in proportion to the efforts of the animal while struggling against submersion. It is the same also with the human subject, as has been verified in all autopsies made by the authors at the morgue, in Paris, during the last ten years. This fact appears to the writers to have a medico-legal value of the highest degree; it permits one at an autopsy to learn concerning what passed in the last moments of life, to know whether or not the individual struggled long and vigorously during the act of drowning.

Malformations of the Hymen in their Relation to Legal Medicine. —

Dr. Delens has published the details of three cases illustrating this topic.³ The first case was that of a girl fifteen and a half years old who was the victim of several repeated assaults, was even afflicted with vulvitis and vaginitis, but yet not deflorated. The integrity of the hymen in

¹ London Medical Record, No. 38, 1878, page 357.

² Annales d'Hygiène publique et de Médecine légale, 2 Ser., Tome xlviii.

³ London Medical Record, August 15, 1878.

this instance was explained by its peculiar formation; it was thickened to at least one millimetre, and presented an opening only one millimetre in diameter. It was as resistant as an imperforate hymen.

The two other cases were examples of biperforate hymen. In one of these the two openings were not more than two centimetres in diameter; in the other they were only seven or eight millimetres by three or four. In such cases the central firm band is an obstacle to defloration; and the smaller the opening the more difficult the rupture of the part.

The Lungs of New-Born Children.—Professor Giovanardi has published in a recent number of the *Rivista Sperimentale di Medicina Legale*¹ the details of some experiments designed to show the fallacy of some of the accepted tests of respiration in new-born children, and to suggest a method for reaching more reliable conclusions under such circumstances.

He remarks that in order to determine whether or not a child has been born living, we look for the required proofs in the color, volume, consistency, and external aspect of the lungs, in their absolute weight and the quantity of blood contained in the pulmonary vessels; but for the most certain proof the medical jurist relies on the results of the application of the hydrostatic test. But all the authorities on legal medicine agree in the following propositions: (1) That the fact that the lungs float does not necessarily prove that they have breathed; and (2) that the fact of their sinking in water does not indicate in all cases that the child has been born dead.

The floating of the lungs of a child who has not breathed may be due to (1) artificial inflation; (2) putrefaction; (3) emphysema; (4) congelation; (5) their preservation for some time in alcohol.

On the other hand, the sinking of lungs which have breathed may depend: (1) on a general sanguineous congestion of the pulmonary vessels; (2) on hepatization, or tuberculosis, or other deposits in the lungs; (3) on advanced putrefaction, with destruction of the air-cells; (4) on the act of boiling, or any cause which increases the density of the texture of the lungs.

In addition to these, the usually recognized conditions which modify the value of the hydrostatic test, Professor Giovanardi has discovered others which he deems important, namely, the effects produced by prolonged exposure in water on the lungs of new-born children who have breathed. He draws the following conclusions from his experiments:—

(1.) The lungs of a child who has breathed sink in water if they are allowed to remain eleven or twelve days immersed in that liquid.

(2.) When the entire body of a child who has breathed is placed in water, the chest being closed, the lungs will continue to float up to the

¹ Dublin Journal of Medical Science, November, 1878, page 415.

stage of their complete destruction by putrefaction; when the cavity of the chest is opened so that the water may have free access to the lungs, the latter will sink after fifteen or twenty days' immersion of the body.

(3.) In cases in which the body of a new-born child is found cut to pieces, the chest opened, and the lungs exposed, an expert must not infer that the child has not breathed because the lungs sink in water.

(4.) By drying the lungs one may determine whether the sinking in water is owing to the fact that respiration has not occurred. If the child has breathed and the lungs have been for several days immersed in water, the lungs, if dried artificially, will float; but if breathing has not occurred the lungs, if dried, will sink again.

PROCEEDINGS OF THE SUFFOLK DISTRICT MEDICAL SOCIETY.

T. M. ROTCH, M. D., SECRETARY.

SEPTEMBER 28, 1878. The meeting was called to order at seven and one half P. M., the president, DR. C. D. HOMANS, in the chair. Fifty-six members were present. The records of the last meeting were read and accepted.

Tubercular Meningitis. — DR. F. H. DAVENPORT read a case of tubercular meningitis. The patient, a child two years of age, of a delicate constitution, presented an unusually interesting picture of tubercular disease from the fact of its being so typical in its course, with the exception of absence of any change in the fundus of the eye. The *tâches cérébrales* of Trousseau were most perfectly marked, but the points which the reader considered most worthy of notice was that the temperature was singularly uniform, standing at 100° F. almost without exception for fourteen days, while the pulse showed the most decided variations, ranging from 60 to 130. The stage of vomiting also was very short, occurring but three times in the course of the disease. By report of Dr. E. G. Cutler, who made the autopsy, there were minute ecchymoses of the size of the head of a pin on the anterior aspect of the abdomen, on the palms of the hands and the soles of the feet, and a few on the face. The anterior fontanelle was not entirely closed; the dura mater was not abnormal, only rather tense. The convolutions were flattened and broadened, dry and sticky. Along the course of the vessels, quite high up on the convexity of the brain, especially about the fissure of Sylvius, there were many small granulations, evidently tubercle. On the left side, near the commencement of the third frontal convolution, there was a mass the size of a split pea, which was caseous. The tubercles were not so numerous on the right convexity. There was also a mass at the posterior portion of the middle fossa. At the base of the brain there was a purulent infiltration of the pia mater over the valve of Vieussens, and there were numerous tubercles along the fissure of Sylvius of both the right and left sides. Both lateral ventricles were enormously distended with a clear serum, as were also the third and fourth, the

amount in all being fully two ounces. Nothing abnormal in substance of brain or centres. An examination of the thoracic and abdominal viscera showed the presence of a large number of tubercles in the lungs, uniformly scattered through the substance. The lungs presented no other lesion whatsoever. There were also a few tubercles on the pleura, and the spleen, though of normal size, was completely studded with them. There was a slight ulceration at the lower portion of the ileum, apparently of a tuberculous nature. There were a few tubercles in each kidney. Tubercles were found to be pretty well scattered through the liver. The mesenteric and bronchial glands were enlarged and caseous. The interesting feature in connection with the post-mortem examination was the fact that the lungs, with the exception of the tubercles, were perfectly normal, such a condition belonging to the rarities of pathology.

Elastic Ligature. — DR. WALTER ELA read a paper on the Elastic Ligature in Fistulous Tracks, which was published in the JOURNAL of January 23, 1879.

Thymol. — DR. CHARLES H. WILLIAMS read a paper on Thymol and some of its Advantages over Carbolic Acid. Some specimens were shown, and the method of preparation was explained, as well as some experiments on its clinical and antiseptic qualities. It was stated that thymol is soluble in about one part to one thousand parts of water, and that this is sufficient to prevent an infection of wounds, though a solution with small additions of alcohol and glycerine was preferred. A number of cases which Ranke reports from the clinic at Halle were referred to, and fifty-one cases, including some very unpromising ones, were all reported as doing well. The most noticeable results obtained were the small amount of secretion from the wounds, the rapidity of healing, and the thorough protection. The reader stated that thymol had been tried in a number of successful ovariectomies, and he had used it himself in an operation for cataract extraction, and in some lesser cases with very good results. Its advantages over carbolic acid were that it produced less secretion, and consequently gave the wound more rest, as the bandages had to be changed less frequently, thus allowing the healing process to go on more rapidly. It does not have any poisonous effect; does not irritate the skin or edges of the wound; requires no protective under it; does not cause anesthesia, or desquamation of the operator's hands, or irritation of the air passages; has an agreeable odor; and does not injure the instruments immersed in it.

Rhizopods. — DR. EPHRAIM CUTTER read a paper on the so-called *Asthmatos Ciliaris*, a rhizopod which he had detected in the nasal secretions of a child one and one half years of age, and which he cured by the use of the nascent chloride of ammonium passively inhaled. Dr. J. N. Salisbury, of Ohio, had described the parasite in *Hallier's Zeitschrift*, Jena, January, 1873, as the cause of infusorial catarrh and asthma. Enlarged micrographic drawings of the parasites were projected by means of a lantern on a screen, and their morphology was described. The differential diagnosis from ciliated epithelium is as follows: First. The so-called rhizopods are not found in any catarrhal excretions excepting those of the contagious ones. Second. The feet or processes have been observed to draw into the body repeatedly, to fuse together, to vary in number from four to fifty, to vary in length from the diam-

eter of the body to thrice that diameter, while cilia of the epithelium are one eighth of the length of the body. Third. The gubernacular method of genesis is not characteristic of ciliated epithelium. Fourth. The processes arise from the periphery in scattered masses, while cilia of epithelium arise from a ridge. Fifth. The rocking and locomotive movements of the rhizopods are not characteristic of epithelial cells. Sixth. Strong chemical agents often fail to destroy movements of the cilia of epithelium, while the bland salicylic acid inhaled destroys the *asthmatos ciliaris* almost immediately. Seventh. The *asthmatos* has been seen to turn over twice in twenty minutes; the gubernaculum to crook like the letter W, and then like the letter V; next to straighten out at an angle of 135° with the body; afterwards the body moved 90° on its own axis, and the gubernaculum erected itself to the shape of a crozier. The reader presented six microphotographs of the *asthmatos ciliaris*, taken from the nasal excretion.

DR. HUNT made the following remarks in regard to Dr. Cutter's paper: I found myself in condition this morning to investigate the characteristics of the discharge in coryza: the watery portion contains but few morphological elements; in the muco-purulent product of a forcible expulsive effort there was an abundance of pus corpuscles and ciliated epithelial cells; the latter were varied in shape, often approaching a spherical form from the failure of the pointed extremities; generally the vibrations of the ciliæ had ceased; when vibrating they would sometimes come in contact with the glass cover or other impediment; then the cell was moved. The nucleus of the cell was generally visible. I found all these characteristics of this discharge described in Ranke's *Physiologie*, page 457, third edition, Leipzig, 1857. I saw nothing like an infusorial growth, and I think from Dr. Cutter's description that he has seen no more than I have; he figures nothing more than can be observed in any case of muco-purulent inflammation of the Schneiderian membrane. It may seem unjust to doubt Dr. Cutter's opinion as to his observations, but I would submit that one who, referring to figures like those which the gentleman has shown this evening, demonstrates the evident ciliæ of the structures shown as "false feet" of rhizopods lays himself open to suspicion; the "false feet" which gave origin to the old name of "pseudopods" were amœboid processes, and have no relation to ciliæ. Since the figures exhibited show nucleated structures I would humbly suggest that this rarer characteristic of rhizopods should be represented in the nomenclature.

NOTE. I have had the pleasure of inspecting six photographs which Dr. Cutter has furnished as exhibiting proofs of the correctness of his observations. I find two taken with the one-fiftieth objective entirely worthless; they show nothing but a coarsely outlined object. Nos. 1 and 2, taken with a one-sixth objective, are from the same specimen, merely mounted differently; they furnish an indistinct picture of a spherical cell, with a long process, and a very indistinct clump of ciliæ; probably nothing definite as to structure can be demonstrated; surely no appearances that might not have been photographed from the muco-purulent discharge from the nose. No. 3 is quite like an ordinary healthy ciliated cell, and No. 4 is probably a poor picture of such a cell seen "end on." Dr. Cutter's diagnosis of rhizopods from ciliated epithelium is made by means of the following characteristics: First. Rhizopods occur only

in contagious catarrhs; as to this point he should have taught us how and where to find such catarrhs. Second. The feet or processes have been observed to draw into the body, to fuse, to vary in number from four to fifty, to vary in length in comparison to the diameter of the body of the cell. I have nothing to say on these points excepting that the so-called feet or processes are ciliae, and that every statement might be made with equal truth of cells thrown off from an inflamed mucous membrane. Third. The gubernacular method of genesis. Dr. Cutter figures and describes a gubernaculum, but no "genesis;" he does not describe it, and I will admit that I am in error if he will *demonstrate it*. Fourth. The processes arise in scattered masses, while ciliae of epithelium arise from a ridge. This speaks for a rather superficial study of such epithelium as seen in the product of a coryza; it is needless to say that the arrangement of the ciliae and the shape of the cell undergo many variations in regard to the characteristics which belong to a normal ciliated cell. Fifth. The motion. This may be seen in a cell where the ciliae vibrate as I have stated. Sixth. Destruction of movements by bland salicylic acid. The movement stops of itself in a few minutes; what Dr. Cutter says of strong chemical agents applies only to a healthy cell. Seventh. This repeats in detail what has already been stated as to motion, and adds the "crooking" of the "gubernaculum." Having answered as to movement I would reply to the latter point by referring to Figure 3, Plate XXI., of the 1857 edition of Hassall's Microscopic Anatomy; here it is seen that this characteristic of epithelial cells and some others were figured by Hassall twenty-one years ago.

THE PLAGUE.

WE have abstained from any remarks upon the epidemic now raging in Southeastern Russia until in possession of more reliable and exact information as to its extent and character. There seems no longer any reason to doubt that it is the plague. The large number of those exposed to the contagion who are attacked, its very rapid spread, the short interval (some hours in many cases) between the appearance of the first symptoms and death, and the enormous mortality, from eighty-five to ninety per cent. of those attacked, are all characteristic of the plague. We know of no exanthematous disease so sudden in its onslaught, with high fever, frequent pulmonary complications, and glandular swellings, especially in the groin, except the plague.

These buboes, where death has not intervened before their appearance, are sufficient to distinguish the disease from typhus fever of however malignant a type. In all descriptions of the disease, whether ancient or modern, they occupy the prominent place, and so pathognomonic have they been regarded that the term pest or plague, at first applied to every very fatal epidemic, became long since synonymous with *pestis bubonica*, or bubo plague. It is not probable that the Russian government has at any time since the middle of December been ignorant of the real nature of the disease, and greater frankness and consistency on its part would have disarmed the extravagant rumors which have been circulated, given confidence to its neighbors, and caused no more injury to commerce than the course which it has pursued.

The epidemic had assumed serious proportions by the 25th of November; the government was only officially informed of it on the 11th of December; ten days more elapsed before any systematic or energetic means were taken for preventing its spreading further, since which time the authorities have exerted themselves to the utmost. But though the precautionary measures adopted are as against the plague, namely, the erection of the infected districts into a distinct province with its own governor; the establishment of quarantine stations on the borders of this district, and of a double *cordon militaire*; an entire cessation of intercourse, as far as possible, and even of postal communication, except after thorough disinfection; and the wholesale destruction by fire of depots of provisions, and even of villages, — still so late as January 18th the government, though acknowledging a mortality of not less than eighty-four per cent. of the attacked, was using the terms “the epidemic,” “the disease,” “malignant typhus,” “galloping typhus with pneumonic complication,” and represented the disease as diminishing; at the same time private intelligence represented the disease as increasing, and it was openly called the plague in a St. Petersburg medical journal. This want of candor has undoubtedly tended to increase the panic and to foster exaggerated rumors. Although intelligent precautions have been taken in Moscow, as indicated by the closing of all basement dwellings, the erection of clean temporary buildings, of furnaces to burn infected clothes, and the gratuitous distribution of cooked food, the report that cases of the disease had occurred there or at Lower Novgorod was evidently premature. Indeed, the latest available accounts give every reason to suppose that the disease, at least as an epidemic, has not appeared either to the north or west of the quarantine station of Zaritzin. A telegram, it is true, has appeared announcing the appearance of the plague in Thessaly, and any day may greatly modify the situation. The infected district at present is in the lower valley of the Volga, near the Caspian Sea. The sanitary lines extend on both sides of the river, a distance of one hundred and fifty miles. Zaritzin, a town of fifteen thousand inhabitants, and a quarantine station, is at the north-western extremity of this district on the Volga, and Astrakhan, the capital of the province, at the southeastern extremity. There has been no actual outbreak of the disease in the town of Astrakhan itself. Its first appearance was in the village of Wetlianka, where it is reported to have been introduced in the booty of returned Cossacks, which had escaped disinfection. From whence these Cossacks had returned we do not know, but it is very certain that plague has been prevalent in the Persian province of Ghilan, at the southwest corner of the Caspian, since 1876; the chief intercourse of Russia with Persia is through the ports of this and neighboring provinces, and certain precautions have been taken by Russia for some time back against the introduction of the disease from this quarter.

Considering the very sparse population of the infected country, which is represented at from one to three to the square verst (two thirds of a square mile), the spread of the disease has been very rapid, its progress being reckoned at about thirty miles in three days. Thus far it seems to have followed the water communication of the Volga, but Zaritzin is connected by rail with the entire net-work of Russian railways and with the rest of Europe, and more-

over the valley of the river Don, which flows into the Sea of Azof, here approaches very near the valley of the Volga. Should this point be invaded there would be much greater cause for general uneasiness. For a vivid but careful account of what the plague can do under favorable circumstances we refer our readers to Hecker's *Epidemics of the Middle Ages*, where they will find the progress and consequences of the black death of the fourteenth century portrayed.

This was the most terrific visitation of disease on record, and one of the most important events in the history of modern civilization. It surpassed all other epidemics of bubo plague. The first extensive epidemic in Europe occurred in the middle of the sixth century, in the reign of Justinian, and is known by his name; its last appearances were in Malta in 1813, in Noja, Lower Italy, in 1815, in Majorca in 1820. It is a mistake, however, to suppose that plague was a disease of the past; cases are probably always to be found in parts of Persia and Syria.

In comparison with past epidemics Europe has in its favor at present the greater cleanliness and better ventilation of its towns, and the better knowledge of sanitation in quarantine and disinfection; but on the other hand, the disease is favored by the great rapidity and intricacy of communication between different points, and the consequent difficulty of making practical application of our increased knowledge. Notwithstanding the virulence of the plague of the fourteenth century there elapsed three years from its exportation from Syria in 1347 to its introduction into Russia in 1351, and this was effected by the way of Sweden and Norway, after it had made the complete circuit of Europe. It took the disease three months to travel from the coast of England up to London. There has always been much difference of opinion as to whether the plague is a directly contagious disease, and it is perhaps better to regard the question as an open one still. Liebermeister calls attention to the fact that the same discussion has been and is still going on in relation to typhoid fever, cholera, and dysentery, and classifies the plague with them among the contagious miasmatic or indirectly contagious diseases. The contagion is certainly, as a rule, indirect, that is through clothes and other effects, and not directly transmitted from individual to individual. The stage of incubation is given at from two to seven days, but the plague poison is supposed to be capable of living a very long time under certain conditions outside the human body.

The season of the year and climate have only a very slight influence upon the disease, but moderate warmth with dampness seem favorable to its propagation. It is not a disease of tropical climates, and the extremes of temperature, though not hindering the spread of the disease, diminish it. The epidemic of the fourteenth century is reported to have attacked the robust by preference. Though so far removed from its seat the present epidemic is of the greatest interest to us in the United States in its character and progress. It offers us an opportunity to observe the application and efficiency of various systems of quarantine upon an extended scale, and of methods of disinfection, from which much may be learned of value in dealing with those epidemics which threaten our own quarter of the globe.

THE INSANE.

IN continuation of our discussion of insanity, we should notice a meeting held on Monday evening, February 3d, in Tremont Temple, Boston, to consider the subject of the committal of insane people to asylums, and their treatment while there. Considering the fact that the lawyer occupying a prominent seat on the platform began his efforts some months ago, he can hardly be congratulated on his success. Hon. S. E. Sewell, Mr. Wendell Phillips, Chas. G. Fall, Esq., and the author of *A Mad World and its Inhabitants*, the latter two having been introduced as *distinguished gentlemen*, were the sole occupants of the platform. Massachusetts was placed one hundred years behind England, Belgium, and even France in laws regarding insanity; twenty men from high social life in Boston were reported shut up in the McLean Asylum because they brought disgrace on their kindred through intemperance; Mrs. —, whose case was related in the JOURNAL some time ago, was said to have been "held to the floor while an infuriated nurse tears her throat to ribbons with the sharp end of a spoon;" and one facetious young woman, who was alleged to have assisted in sending her mother to an insane asylum for refusing to consent to her marriage with the man she wanted, was reported by a volunteer speaker as having committed matrimony to her liking, and then having been kicked out of bed by her lord and master within six weeks. We need not further explain why we consider the meeting, as a whole, beyond the range of sober criticism. The lawyer repeated his statement that all insane people placed in state asylums must be sent by the courts, while two medical certificates sufficed for the private asylums, although his attention had been called to its incorrectness when he made it in the columns of one of our daily papers several months ago. Indeed, during the year 1878, *all* the private patients placed in the Danvers Hospital, fifty-one in number, were committed by their friends or relatives, precisely as at the "private asylums," and *none* were sent by the courts; at Taunton five were so committed, and five by the courts; at Northampton six, and four by the courts; at the Worcester Hospital twenty-four, and thirty-eight by the courts.

The Holm case was an unfortunate one. Although the physicians connected with sending him to the asylum and detaining him there acted in a thoroughly honest way, whether or not the family were mistaken or hasty, there can be no doubt that serious defects in our laws have been revealed. In the later case of the general paralytic, referred to by us last week, money was offered with some liberality to experts who declined to testify. *Non tali auxilio, nec defensoribus istis*. The cause is a good one, and, in spite of the harm done to it by the meeting to which we have referred, is likely to be successful, and be treated in a rational way. If Governor Talbot's plan of a consolidated board of health, charities, and lunacy is carried out, of course the ground will be satisfactorily covered; and a judicious central board to manage the affairs of the insane would be welcomed by the superintendents, as well as put an end to the complaints and carpings of fault-finders, and the inevitable misconstructions that always prevail under our present system. Our asylums are already managed by their medical officers with all possible kindness.

MEDICAL NOTES.

— Dr. David W. Cheever, of the City Hospital, a few days ago removed a large tumor from the neck of one of the hospital patients. The latter was a man forty-three years of age, who first came to the hospital one year ago, at which time he was advised to have the growth removed, but refused. At the time of the operation the tumor was twenty months old, and had developed rapidly during the past two months. Dr. Cheever tapped it some weeks ago, giving issue to half an ounce of glairy fluid. The tumor was as large as a small cocoa-nut; was situated between the lower jaw and clavicle on the right side; was very irregular and lobulated in form, sending out processes in all directions, notably upward toward the ear and directly backward to a line downward from the mastoid process. Dr. Cheever made two incisions: one extending from the angle of the inferior maxillary nearly to the inner end of the clavicle; the other at right angles with the first, and extending from the middle of the lower jaw nearly to the mastoid process. The platysma and sterno-cleido-mastoid muscles were imbedded in the tumor, and were removed with it. The growth was firmly adherent to every tissue in its vicinity, and was loosened only with great difficulty. Small districts of deep portions of the growth were found to be degenerated. The tendon of the digastric was uncovered, and finally the sheath of the carotid artery, on the outer side of which the tumor had infiltrated among the muscles of the neck. Further dissection revealed the scalenus anticus its upper portion being entirely free from infiltration, but infiltrated matter had penetrated behind it. Nearer the clavicle, when the body of the tumor had been lifted away, was discovered considerable infiltrated substance, enucleation of which was not attempted. Above this point everything was left clean.

The tumor was microscopically examined by Dr. E. G. Cutler, who found it was an adenitis and a peri-adenitis of the cervical glands. It weighed two drachms less than one pound.

—Female pharmacists are quite numerous in Holland. The fashion was set by a Miss Tobbe, who wished to make herself useful in her father's apothecary shop. There was considerable difficulty in obtaining the title, owing to the law, but this has now been altered, and the number of students is at present large. They are much sought for, and are recommended for their orderly habits, their cleanliness, and accuracy. We understand that ladies have become very proficient in the chemical laboratory of the Institute of Technology in this city. This is a kind of work for which women, in our opinion, are eminently more fitted than the practice of medicine.

—The winter meeting of the councilors of the Massachusetts Medical Society occurred on Wednesday, February 5th, at the rooms of the Medical Library Association, the president, Dr. George H. Lyman, in the chair. The chairmen of the various committees made their reports. Nothing of more than ordinary interest transpired until the report of the committee on membership was read. This gave rise to considerable discussion. In regard to delinquent members the general sense of the meeting expressed itself in the

affirmative acceptance of Dr. Bronson's motion that a certain member be sued. The pertinent question as to the actual effect of dropping a member for non-payment of dues was asked, but not answered. The feeling seemed to be that to drop a member merely for non-payment of dues would injure him unnecessarily and establish a bad precedent, for if a Fellow can pay he should be made to pay; if not, his dues should be remitted.

Another topic of interest was the code of ethics. Dr. Cotting stated that at a January meeting of the committee the chairman had been requested to report progress and ask for further time. They had agreed to exclude from the code everything to which objection was made at the 1878 June meeting, retaining all which relates to live questions, and which will assist young practitioners, and aid in settling every question which would be apt to arise. Dr. H. J. Bigelow said that while the code was a code of conduct, and therefore contained something more than mere principles, it would not be possible to arrange for every minor matter which might arise between physicians, that the line should be drawn somewhere, and that he thought the code should be reduced to its minimum, thus avoiding unnecessary and useless verbiage. After some discussion, of which the strongest point was that the society needs the protection of a solid code of ethics, it was agreed that the committee should have the time for which they asked, namely, until the October meeting.

Dr. Sappolini, president of the Medical Society of Milan, was recommended for honorary membership.

On motion of Dr. Draper, it was voted that the treasurer be authorized to treat with the Medical Library Association for rental of its rooms for a term of years for meetings of the councilors at a sum not to exceed \$150.

Drs. Ellis, Bowditch, and Storer were appointed a committee to draw up resolutions relative to the death of Drs. Jacob Bigelow and J. B. S. Jackson. Other committees were appointed for similar service in other parts of the State.

NEW YORK.

— Mr. Callender lately performed an amputation, by the invitation of Prof. James R. Wood, at his Saturday afternoon clinic at Bellevue Hospital, in the presence of one of the largest medical audiences ever gathered in New York, and on the 5th of February he sailed for England by the steamer Scythia.

— Dr. E. H. Janes, assistant sanitary superintendent, states that while there are undoubtedly cases of pleuro-pneumonia among cattle in the neighborhood of New York and Brooklyn, as is very apt to be the case at this season of the year, there is no reason whatever to suppose that there is any special increase in it the present winter. From information furnished by large dealers and others in a position to know, he believes that there is really very little of the disease here, and he thinks that the jealousy of dealers in England and their charges against American cattle have started the idea that it exists to a large extent in this country.

THE NAVY.

—Too much praise cannot be accorded those members of our profession who have bravely and conscientiously attended the yellow fever victims, but while we heartily appreciate their efforts we think that they did only their duty. Several bills are before Congress to give unprecedented advancement to medical officers of the navy as a reward for simply performing their duty. This appears to be somewhat hasty and injudicious, since at least half the members of the medical corps of the navy have attended yellow fever patients, and the remainder have been quite ready to perform the same service.

LETTER FROM LONDON.

SEWERAGE-SYSTEMS.

MR. EDITOR, — In my last letter I gave a sketch of the stages through which the sewage question has gone, up to the passing of the Rivers Pollution Act of 1876, and I was proceeding to describe some of the measures which are being taken by the different towns to enable them to act in accordance with the requirements of the law, beginning with an account of the cess-pool or pail system, as it is being carried out in some of our large manufacturing towns. In my present letter I shall endeavor to explain the methods of dealing with the sewage where water-carriage is employed, only two of which can be said really to aim at epuration, namely, chemical treatment and irrigation over land; for the methods of simple filtration and mechanical deposition are so obviously inadequate that they may be left out of account.

Of the chemical processes the one which has been most extensively employed is that which is known as the "precipitation by lime," which consists simply in the addition of cream of lime to sewage water, by which many of the constituents previously in solution are thrown down, carrying with them the solids held in suspension. As a matter of fact, however, a quantity of organic material is left behind in the effluent water, which, though in appearance quite clear, is from the sanitary point of view little better than before the addition of the lime, and quite unfit to be turned into the rivers. Nevertheless there are a good many towns, some of them of large size, which are still making use of this process. The largest of these is Birmingham, where, although, as I mentioned in my last letter, a large proportion of the excreta is collected by the pail system, all the water-closets in the town empty into the sewers, and it is still necessary to adopt means for purifying the sewage. As much as thirteen tons of lime are used daily in Birmingham, and after the mixture has been effected the resulting liquid is allowed to pass slowly through a series of tanks, where the precipitate settles. This precipitate is not found to fetch a good price as manure, and the process is therefore unsatisfactory, not only from the fact that the water is not adequately purified, but also because it produces little, if any, return for the outlay upon it. This process is carried out also at Bradford, a town with about 150,000 inhabitants, and at Leicester, with 110,000. In some places other chemical substances are added with the lime, as, for instance, at Bolton, in Lancashire, where lime, carbon,

and a dilute acid are added; but all methods in which lime is the main agent have failed to get rid of all the organic impurities, and hence the liming process is being gradually abandoned, or, as is in some places the case, irrigation is being superadded.

The process which, next to the addition of lime, has been most largely used, is that known as the A B C method. This consists in the addition of a mixture of charcoal, blood, and clay to the sewage, which is subsequently treated with a salt of alumina to precipitate certain impurities, which would be otherwise left behind. The principal town where this process is carried out is Leeds, with 300,000 inhabitants (which is, however, partly dealt with on the pail system), where it has been adopted after a series of experiments with various chemical methods. The plan has, however, been too recently begun for any definite conclusions as to its ultimate value to be arrived at. For the present it cannot be made other than a very expensive one, for it is costing the municipality not less than from \$18,000 to \$20,000 a year. At Leamington, in Warwickshire, a town with 20,000 inhabitants, where the A B C process was tried for four years, it was abandoned, partly on account of its expense, and partly, it was said, on account of the imperfection of the results. Experiments have, however, been made with a portion of the London sewage to test this method, and with good results so far as the purification was concerned; for the analyst who was appointed to watch them on behalf of the metropolitan authorities reported that the effluent water was sufficiently clarified to be admissible into any ordinary river without producing a dangerous degree of pollution; nor was the manufacture found to be productive of nuisance; but the money value of the manure was stated to be so small that the process could not be otherwise than very costly, and hence it was decided not to adopt it for the sewage of London. On the other hand, the process has been found to work very well at Aylesbury, a small town of about 7000 inhabitants, in Buckinghamshire. Here the effluent water is allowed to pass through a fish pond, and it is found that fish can thrive and multiply in it, showing that the amount of organic pollution must be small. The manure made from the precipitate is also in great demand amongst the farmers of the surrounding districts and is even supplied to distant places, large orders having during the past year, been received from Italy. As is the case with anything else that is new, there is a great deal of prejudice to be got over, and moreover a large demand for a new material cannot be created all at once, so that it is quite possible that, as time goes on, the A B C process may prove far more remunerative in the case of large towns than it is possible to make it at present. To judge by results, it certainly appears to be one of the more hopeful of the many projects that have been suggested with a view to solving the sewage problem.

I can only briefly refer to the various other chemical processes that have been tried. At Coventry, where there are 40,000 inhabitants, a method known as "Anderson's process" is in use, which consists simply in the addition of an impure sulphate of alumina to the sewage. The effluent water is said to be very clear, and fit to be discharged into any river. At Tottenham, with 30,000 inhabitants, Whitbread's process is in use, in which a mixture of monocalcic phosphate, dicalcic phosphate, and milk of lime is added to the sewage, with

the result that suspended matters are completely removed and the organic nitrogen nearly so, the effluent liquid containing phosphoric acid and ammonia. The process was reported upon favorably by the committee on sewage appointed by the British Association, some years ago. Several other processes have been suggested, but most of them are inefficient, or they have not been tried on a large enough scale to allow of any definite statement as to their merits. I will therefore pass on to the question of sewage irrigation.

Of all the processes hitherto employed for the purification of water-carried sewage, by far the most interesting, and in many ways the most important, is that of sewage irrigation. Where it can be carried out under favorable circumstances it is very much the cheapest method; it is attended with the least possible waste of valuable manure; the sanitary results, so far as the effluent water is concerned, are perfect; and there can be little doubt that in the long run it must be found to be a financial success. Hitherto various difficulties have been met with from time to time. For instance, in certain towns, for some cause or other, land has been chosen for irrigation which was considerably higher than the main sewer outlet, and consequently it has been necessary to employ powerful pumps to raise the water to the requisite level. Thus, at Leamington, where, after the abandonment of the A B C process already mentioned, it was resolved to try sewage irrigation, the sewage was let to the Earl of Warwick for £450 per annum, but the earl stipulated that it should be delivered free on to his land, and he selected for the experiment one of his farms situated two miles from the town and at an altitude 130 feet higher than the sewer outfall. The result was that the town had to spend over £16,000 in putting up steam-engines, making a conduit, etc., in addition to which the expenses of pumping amounted to about £1000 a year; so that, taking into consideration the interest on the loan necessary for the preliminary outlay, the municipal authorities had to pay £1600 a year merely because land had been chosen for the purpose which was higher than the sewer level. To show that sewage irrigation is not necessarily associated with a heavy outlay of this kind I will quote the case of Rugby, which is situated within a few miles of Leamington. Here land has been judiciously chosen, so situated that the sewage can run on to it without any pumping, and here not only have no preliminary expenses been incurred (the sewers themselves having been previously made), but the town is able to make a profit of something under £100 a year by subletting, at a considerably higher rent than it was itself paying, the farm rented for the irrigation purposes.

Another difficulty which has been experienced is that although the effluent water is purified, even to the extent of being fit and pleasant to drink, yet in certain instances there has been gross violation of the laws of hygiene in the process of irrigation, and the farms have been allowed to become a nuisance to the neighborhood. It is somewhat hard to get at the exact truth in a matter of this kind, for the authorities are very careful to exclude unwelcome facts of this nature from their reports, and those who suffer from the evil are for the most part little people who are unable to make their voices heard by the general public. I have heard, however, from a trustworthy private source, that at Tunbridge Wells, in Kent, where irrigation is employed, the people living in the cottages in the neighborhood of the farm constantly suffer from

vomiting and diarrhoea whenever, during the warm months, the wind blows off the farm towards them. This town is in the centre of the great hop-growing district of Kent, and I am told that since the introduction of irrigation the hop-pickers working upon the sewage farm suffer at times severely from the same condition, those on the surrounding farms remaining in their usual health. I am afraid that if the truth were known this state of things would be found to be not unfrequently associated with the sewage farms. Against this, however, it is only right to quote the town of Ware, in Hertfordshire, where a tenant farmer, living in the centre of a sewage farm which serves as the receptacle for the excreta of 9000 people, testified to the excellent health enjoyed by himself and all his family. This farm abuts upon a large pleasure ground much used as a holiday resort by the lower classes of London. So far as I have been able to learn, no complaint has ever been heard from this source.

A third difficulty which has been met with is in the quantity of water mixed with the more valuable sewage material. In England it is almost universally the custom to employ the same sewer for the house sewage and the surface water. The whole of the water then becomes polluted, and has to be cleansed. During wet seasons the quantity of water becomes unmanageable; where pumping is necessary, the pumps are liable to become unable to deal with so much liquid, and even if it is carried to the land, so much water added to land already perhaps too wet is likely to do more harm than good. To carry out sewage irrigation in perfection, it will be necessary to make a double set of drains, one for the house and the other for surface water, with the power of utilizing the surface water for the farm at any time that it may be required. At all other times the surface water would be conveyed straight to the river.

A few words as to the quantity of land necessary to cleanse a given quantity of sewage. It is found that so long as land is thoroughly well drained it can purify far more sewage water than it can be said to make use of agriculturally; that is to say, that though 1000 gallons of sewage per diem on a given piece of land will produce the utmost degree of fertility of which the land is capable, yet if 5000 gallons per diem be thrown on to the land, the land will be able to purify it without detriment to itself or to the crop upon it. At the same time care is necessary not to let the water run on too quickly; for, to quote the words of one of our leading agriculturists, "experience has proved that overfeeding with sewage for years has no ill effect, although land may be *choked* with it in one meal." The average in England varies very much. At Edinburgh, which is the largest town that has hitherto been treated by sewage irrigation, and which, moreover, has the honor of having been the first to adopt this method in a systematic manner, there are only 323 acres of land for the sewage of 200,000 people,¹ or about one acre to 600 people, necessitating the supply of about 7800 gallons of liquid per acre per diem. At Doncaster, on the other hand, a farm of 263 acres is set apart for the sewage of 20,000 people, or about one acre to 76 people. Although at Edinburgh the effluent water is quite pure, yet it is certain that the sewage is not being properly utilized, for the amount of organic matter contained in so large a quantity of sewage would probably be sufficient to manure efficiently quite ten times the

¹ It must be borne in mind, however, that Edinburgh, as was mentioned in the last letter, is partially dealt with on the pail system.

area at present employed for the purpose. As a general rule, the towns which have adopted irrigation have chosen farms of such a size that each acre corresponds to a number varying from fifty to a hundred of the population, though even with this proportion it is probable that the sewage is not put to the greatest possible use.

The results of sewage irrigation are, from the agricultural point of view, admirable. To show how it can improve land, even to the extent of making land fertile which was previously useless, I will quote the case of Aldershot, the great military station in Hampshire. Here the sewage from the North Camp, which has a population of 8000 souls, is carried on to 100 acres of sandy heath, which before the irrigation was not worth a shilling an acre per annum. Part of this land is now let for £20 an acre per annum; and the whole of it has proved most productive, Italian rye-grass, mangold-wurzel, and potatoes being the principal crops. At Cheltenham, again, where the sewage from 50,000 people is disposed of by irrigation, the root crops grown on the farm won the first prizes at all the agricultural shows in the district, until at last they were excluded from competition with the produce of ordinary farms. The favorite crop, however, on sewage farms is Italian rye-grass, and of this it is the rule for four and even five crops to be obtained per annum. The farmer at Cheltenham says that "sewage pays best on poor, hilly, heavy grass land, as it makes one acre worth five." The greatest proof of the utility of sewage irrigation is to be found in the fact that, in addition to the very considerable number of corporations which are conducting their own sewage-farm operations, there are now upwards of a hundred owners and occupiers of land in Great Britain who are using town sewage on a large scale, of whom three fourths pay money for the privilege. It is not too much to hope that in a few years all towns will be able to find an advantageous market for their sewage, which will then be a source of revenue instead of being, as is now so commonly the case, a dead loss.

To sum up, then, the future of the sewage question seems to be resolving itself into the following shape: to a very large extent, the pail system will be used in large towns for the lower classes; irrigation will probably be employed almost universally for water-carried sewage. To prevent the farms from being a nuisance, the sewage will have to be subjected to a rough process of purification, by chemical or other means, before being turned on to the land. To prevent the land from becoming water-logged, and to increase the value of the irrigation, a double system of sewers will have to be adopted, one for surface drainage, and the other for the houses. Here and there certain chemical methods like the A B C process may exist alone, but my own belief is that even these will be made subservient to irrigation, and that the effluent water will still be found sufficiently rich in products useful in agriculture to be employed on the land where this can be done without incurring any large outlay. When it is remembered how short a time the question has been seriously under consideration, I think we may congratulate ourselves that the principles by which this gigantic problem is to be solved are so nearly settled. An immense deal yet remains to be done to raise our towns to the level I have shadowed forth, and above all other difficulties to be surmounted is that involved in the question of the utilization of the sewage of the 4,000,000 peo-

ple of London; but events travel quickly nowadays, and under the stimulus of the law, added to the prospect of good financial results, we may hope to see a greater advance in the next twenty years than has occurred in as many centuries before our time.

REPORTED MORTALITY FOR THE WEEK ENDING FEBRUARY 1, 1879.

| Cities. | Popula- tion. Estimated for July, 1878. | Reported Deaths in each. | Annual Death-Rate per 1000 during the Week. | Percentage of total Deaths from | | | | | |
|-------------------------|---|--------------------------------|---|---|-----------------|--------------------------|---------------------|-------------------------|--|
| | | | | The Princi- pal Zymot- ic Diseases. | Pneumo- nia. | Diphtheria and Croup. | Scarlet Fe- ver. | Diarrhoeal Diseases. | |
| New York..... | 1,085,000 | 624 | — | 18.75 | 12.98 | 8.21 | 7.69 | 2.08 | |
| Philadelphia..... | — | 391 | — | — | 13.78 | 1.53 | 3.32 | — | |
| Brooklyn..... | 564,400 | 216 | 19.87 | 18.43 | 15.28 | 6.02 | 4.17 | — | |
| St. Louis..... | — | 111 | — | 9.99 | 18.91 | 3.60 | — | 1.80 | |
| Chicago..... | — | 150 | — | 18.67 | 8.67 | 8.67 | 4.67 | 0.67 | |
| Baltimore..... | 365,000 | 158 | 22.57 | 15.19 | 17.09 | 8.88 | 1.27 | — | |
| Boston..... | 356,500 | 144 | 21.07 | 11.81 | 14.58 | 6.25 | 2.78 | 0.69 | |
| Cincinnati..... | — | 120 | — | 25.00 | 6.67 | 4.17 | 12.50 | 0.53 | |
| District of Columbia... | — | 96 | — | 9.19 | 19.79 | 4.17 | 4.17 | 1.04 | |
| Pittsburgh..... | — | 49 | — | 22.45 | 14.28 | 3.16 | 2.04 | — | |
| Milwaukee..... | — | 23 | — | 32.13 | 4.35 | 34.78 | — | 4.35 | |
| Providence..... | — | 27 | — | 8.70 | 22.22 | — | 3.70 | — | |
| New Haven..... | — | 15 | — | 6.67 | 13.33 | — | — | — | |
| Charleston..... | — | 24 | — | 4.17 | 4.17 | 4.17 | — | — | |
| Lowell..... | 53,300 | 26 | 25.43 | 7.69 | 19.23 | 7.69 | — | — | |
| Worcester..... | 52,500 | 17 | 16.88 | 5.88 | 23.53 | 5.88 | — | — | |
| Cambridge..... | 51,400 | 20 | 20.28 | 30.00 | 10.00 | 15.00 | 5.00 | — | |
| Fall River..... | 48,500 | 19 | 20.43 | 15.79 | 15.79 | 10.63 | 5.26 | — | |
| Lawrence..... | 38,200 | 8 | 10.92 | 25.00 | 12.50 | 12.50 | — | — | |
| Lynn..... | 34,000 | 9 | 13.81 | — | — | — | — | — | |
| Springfield..... | 31,500 | 17 | 28.14 | 11.77 | 11.77 | 5.88 | — | — | |
| New Bedford..... | 27,000 | — | — | — | — | — | — | — | |
| Salem..... | 26,400 | 9 | 17.73 | 22.22 | — | — | 11.11 | — | |
| Somerville..... | 23,350 | 6 | 13.40 | — | 33.33 | — | — | — | |
| Chelsea..... | 20,800 | 5 | 12.54 | 20.20 | — | 20.00 | — | — | |
| Taunton..... | 20,200 | — | — | — | — | — | — | — | |
| Holyoke..... | 18,200 | 12 | 34.88 | 8.33 | 16.67 | — | — | — | |
| Gloucester..... | 17,100 | 8 | 24.39 | 12.60 | 12.60 | — | — | — | |
| Newton..... | 17,100 | 3 | 9.15 | 33.33 | — | — | 33.33 | — | |
| Haverhill..... | 15,800 | 12 | 40.90 | 25.00 | 8.33 | 25.00 | — | — | |
| Newburyport..... | 13,500 | 4 | 15.45 | — | — | — | — | — | |
| Fitchburg..... | 12,500 | 5 | 20.86 | — | — | — | — | — | |

Two thousand three hundred and twenty-eight deaths were reported: 352 from consumption, 317 from pneumonia, 108 from scarlet fever, 82 from diphtheria, 75 from bronchitis, 43 from croup, 34 from whooping-cough, 29 from typhoid fever, 20 from diarrhoeal diseases, 14 from cerebro-spinal meningitis, seven from erysipelas, and four from measles. None from small-pox.

From *bronchitis* 35 deaths were reported in New York, 17 in Brooklyn, six in St. Louis and Chicago, five in Cincinnati, two in Holyoke, one in Boston, New Haven, Gloucester, and Haverhill. From *whooping-cough*, 16 in New York, six in Cincinnati, four in Brooklyn, two in Baltimore, Pittsburgh, and Cambridge, one in Boston and Fall River. From *typhoid fever*, nine in Philadelphia, five in St. Louis, four in New York, three in Baltimore and Pittsburgh, two in Chicago, one in Brooklyn, Boston, and Cincinnati. From *cerebro-spinal meningitis*, four in Chicago, two in Cincinnati, one in New York, Brooklyn, Baltimore, and New Haven. From *erysipelas*, five in New York, one in Chicago and Boston. The returns from seventeen of the nineteen cities in Massachusetts, with a population of 830,150, show an increased mortality from cerebro-spinal meningitis, erysipelas, and whooping-cough; from dysentery about the same, and less from the other zymotic diseases and pneumonia. Nashville remains quite free from the infectious diseases, no deaths from them having been reported for the week. There was one death from trismus nascentium in Charleston; scarlet fever and diphtheria were diminishing in Cleveland, but prevalent. Acute pulmonary diseases very prevalent in New Orleans, but not diphtheria and scarlet fever.

Sergeant Purcell's meteorological record for the week, in Boston, is as follows : —

| Date. | Barom-eter. | Thermom-eter. | | Relative Humidity. | | Direction of Wind. | | | Velocity of Wind. | | | State of Weather. | | | Rainfall. (Melted Snow.) | | | | |
|---------|-------------|---------------|----------|--------------------|---------|--------------------|---------|-------------|-------------------|---------|---------|-------------------|---------|---------|--------------------------|-------------------|-------------|-----|-----|
| | Daily Mean. | Daily Mean. | Maximum. | Minimum. | 7 A. M. | 2 P. M. | 9 P. M. | Daily Mean. | 7 A. M. | 2 P. M. | 9 P. M. | 7 A. M. | 2 P. M. | 9 P. M. | Duration in Hours. | Amount in Inches. | | | |
| | | Daily Mean. | Maximum. | Minimum. | | | | | | | | | | | | | Daily Mean. | | |
| Jan. 26 | 30.841 | 7 | 27 | 3 | 50 | 42 | 59 | 48 | NW | NW | NW | 23 | 18 | 14 | C | C | C | — | — |
| " 27 | 30.031 | 28 | 33 | 26 | 61 | 68 | 61 | 63 | O | SW | W | 0 | 11 | 14 | O | O | R | 5.0 | .01 |
| " 28 | 29.920 | 45 | 66 | 37 | 52 | 42 | 67 | 70 | SW | W | W | 8 | 11 | 11 | R | C | F | 4.5 | .05 |
| " 29 | 30.179 | 25 | 40 | 16 | 70 | 42 | 54 | 53 | N | NW | NW | 7 | 20 | 12 | F | C | C | — | — |
| " 30 | 30.086 | 23 | 33 | 9 | 61 | 34 | 62 | 52 | NW | N | NW | 7 | 14 | 7 | C | C | C | — | — |
| " 31 | 29.686 | 31 | 39 | 19 | 75 | 45 | 63 | 61 | W | W | W | 5 | 13 | 8 | O | O | C | — | — |
| Feb. 1 | 29.497 | 18 | 40 | 9 | 72 | 40 | 54 | 55 | NW | NW | NW | 6 | 20 | 17 | F | F | C | — | — |

| Weekly Sum-mary. | Barometer. | Thermometer. | Humidity, Saturation being 100. | Wind. | Rain. |
|------------------|-------------|--------------|---------------------------------|-----------------------------|--------------------------|
| | Mean 29.963 | Mean 25.6 | Mean 57.9 | Total miles traveled, —. | Total amt. .06 in. |
| | Max. 30.427 | Max. 56.0 | Max. 82 | Prevailing direction, N. W. | Duration, 9 hrs. 30 min. |
| | Min. 29.434 | Min. 2.0 | Min. 28 | | |
| | Range .993 | Range 54.0 | Range 54 | | |

Barometer corrected for temperature, elevation, and instrumental error.

Explanation of weather symbols: O., cloudy; C., clear; F., fair; G., fog; H., hazy; R., rain; S., snow; L. S., light snow; T., threatening.

Station: Latitude 42° 21'; longitude 71° 4'; height of instrument above the sea, 77.5.

Surgeon-General Woodworth reports small-pox prevalent and yellow fever less so in Havana; small-pox raging in the northern provinces of Brazil, and the "black plague" somewhat prevalent; also small-pox, yellow fever, and pernicious fever fatal in Rio de Janeiro. The death-rate for the week ending January 18th for the twenty large English towns with a population of 7,383,999, was 28.1, an increase of one per 1000 from the previous week: for London 28.1, Dublin 48.3, Liverpool 36.4, Manchester 34.9, Birmingham 29, Brighton 19.8, Sunderland 20, Glasgow 27, Edinburgh 23. Acute pulmonary diseases were very prevalent. One hundred and twenty-seven deaths were reported from scarlet fever, 121 from whooping-cough, 50 from fever, 36 from measles, 20 from diphtheria, and 12 from small-pox (all in London). There was an increased mortality from small-pox in Dublin. For the week ending January 11th, in one hundred and forty-nine cities and towns of Germany, with a population of 7,460,963, the annual death-rate was 24.8: 27 in Berlin, 23.6 in Leipsic, 27.8 in Munich, 30.6 in Dantzic, 22.5 in Dresden, 24.8 in Hamburg, 23 in Cologne. Four hundred and ninety four deaths were reported from consumption, 413 from inflammatory diseases of the respiratory organs, 174 from diphtheria and croup, 99 from scarlet fever, 59 from whooping-cough, 49 from typhoid fever, 44 from measles, 28 from puerperal fever, three from typhus, none from small-pox. Fevers are very prevalent, cholera mildly so, in India. Small-pox and typhoid fever still prevail in Paris; small-pox, typhus and typhoid fevers, in St. Petersburg; scarlet fever and diphtheria in Berlin; small-pox and diphtheria in Vienna; small-pox and typhus in Budapesth; typhus fever in Naples. Although cases of the plague are reported in Thessaly, the indications are that it is abating in Southeastern Russia.

ERRATUM.—In the last number of the JOURNAL, page 198, line 25, the word "lime" appears instead of "wine."

MASSACHUSETTS MEDICAL SOCIETY.—A meeting of the Censors of the Massachusetts Medical Society will be held at the Medical Library, 19 Boylston Place, February 20th, at three P. M.